
# Enterprise Data Management Maturity Model

**Prepared by:**
**DataFlux Corporation**

# Executive Summary

Gaining a competitive advantage in the market used to be a straightforward, common sense process. You could provide industry-leading products and services, setting the standard in your market. Or you could excel at marketing and sales functions and create an irresistible "buzz" within your prospect base.

Times have drastically changed. Today, gaining a competitive edge is extremely difficult. Companies must build new systems, implement new strategies or identify new markets in order to compete – or survive. What has historically been ignored is proper management of the data that supports your ability to make reasonable, results-oriented decisions. Companies misunderstand how effective data management yields a competitive advantage.

Although many organizations know that data is an important corporate asset, data is quite different from other corporate assets. As Larry English, noted pioneer in the field of information quality states, "Data is the only business resource that is completely reusable. All other resources, when used, are used up..."[1]

However, unlike tangible corporate assets which have a structured value, depreciation schedule and so forth, it is difficult for many companies to place a definitive value on data. As a result, the perceived lack of a tangible value makes justifying data management efforts a tricky endeavor.

In recent years, however, forward-thinking companies have begun to understand one key idea: the cost of ineffective data management is much higher than the cost of successfully managing data. Put simply, organizations depend on data. Regardless of industry, revenue size or competitive environment, every company relies on its data to produce information that can guide effective decisions. The quality of the results from any analysis is only as good as the quality of the inputs (the data) that feed that analysis.

Data management establishes and deploys the roles, responsibilities, policies and procedures pertaining to the acquisition, maintenance, dissemination and disposition of data. To succeed, a data management program requires a partnership between the business and technology groups. The business areas are responsible for establishing the business rules that govern the data and are ultimately responsible for verifying the data quality. The information technology (IT) group is responsible for establishing and managing the overall environment – architecture, technical facilities, systems and databases – that gather and house data throughout the enterprise.

Given the broad focus of data management, an effective program relies on a combination of people, process and technology. This paper explores the major issues of building better data and how to utilize these three elements to achieve more effective data management policies. More specifically, this paper defines an organization's data management maturity based on the processes that are practiced and the value that an organization places on data management.

# Overview

The Capability Maturity Model for Software (also known as the CMM and SW-CMM), published by the Software Engineering Institute (SEI) and Carnegie Mellon University, is a well-established model that defines software development maturity of organizations based on procedures and processes. However, it does not address the maturity of an organization with respect to how data is managed. Larry English adapted the CMM to data quality in his book titled *Improving Data Warehouse and Business Information Quality*.[2]

---

1 Larry English, Improving Data Warehouse and Business Information Quality. NY: John Wiley & Sons, 1999. Pg. 5.

[2] *Ibid, English.*

In this paper, we explore a new maturity model – the Enterprise Data Management Maturity Model – that helps companies identify and quantify their respective levels of data maturity. By assessing an organization's data management maturity, you can understand the risks associated with undervalued data management practices. The maturity model also helps organizations understand the benefits and costs associated with a move to the next stage.

Organizations must recognize the advantages of refining and strengthening their data management processes. Those that plan their evolution in a systematic fashion gain over those that are *forced* to change by events that are outside of their control. By implementing change on your terms – within a reasonable timeframe – you can accurately set goals for data maturity.

Understanding the maturity model can help you control the evolution from stage to stage. You need to know at what stage you are currently operating and why you are there. This will help you understand how and when to move to the next stage. The stages of the Enterprise Data Management Maturity Model are:

Stage 1 – Unaware
Stage 2 – Reactive
Stage 3 – Proactive
Stage 4 – Predictive

Assessing the current level is only the start. Organizations also need to determine what stage is appropriate for their organization and establish the actions and priorities for improvement.

## ***The Blind Men and the Elephant***

There is a Buddhist parable called "The Blind Men and the Elephant." In the story, Buddha tells of a raja that wanted to understand what blind men would "see" when they were introduced to an elephant. Each blind man was led to a different part of the elephant.

When the first blind man reached the elephant, he felt the elephant's leg and he said, "The elephant is a pillar." The second blind man first reached the elephant's tail. To him, the elephant was a rope. The third blind man, when he reached the elephant, he felt the elephant's ear and he declared, "The elephant is like a piece of cloth." Finally, when the fourth blind man found the elephant, he touched the elephant's trunk. He declared that the elephant was a snake.

All the blind men felt certain that they were right. The blind men began yelling and arguing about what an elephant really is. Soon the argument became a confusing fight. The raja laughed and enjoyed the scene, as it showed how people who are ignorant of the "whole picture" are quarrelsome, wrangling and uncooperative. The moral, according to Buddha, was:

"For, quarreling, each to his view they cling.
Such folks see only one side of things."

Most organizations approach data management in the same fashion that the blind men approached the elephant. In many companies, people tend to see only the data that is in front of them. There is little coordination across the corporate or geographical boundaries, just as the blind men were unable to convey their impressions about the elephant to recognize the entire entity. This leads to confusion, disputes and a narrow view of events.

Solid data management can help you achieve a more complete picture and facilitate cross-boundary communications on data management. There are three main ways to approach this improvement process:

- Understand how you manage your data today
- Determine what policies need to be enacted to progress your management of data
- Assign a potential return on investment from enacting data management policies and the risks for not progressing along the data management maturity model

## The Enterprise Data Management Maturity Model

Figure 1 shows the Enterprise Data Management Maturity Model. The model has four stages of data management maturity in a continuum. The movement from one level to the next is very fluid and will not happen all at once. Often, different parts of an organization may be at different stages of the maturity model. And ultimately, an organization or parts of an organization may not choose to move to a higher maturity level if the costs of the move outweigh the benefits.

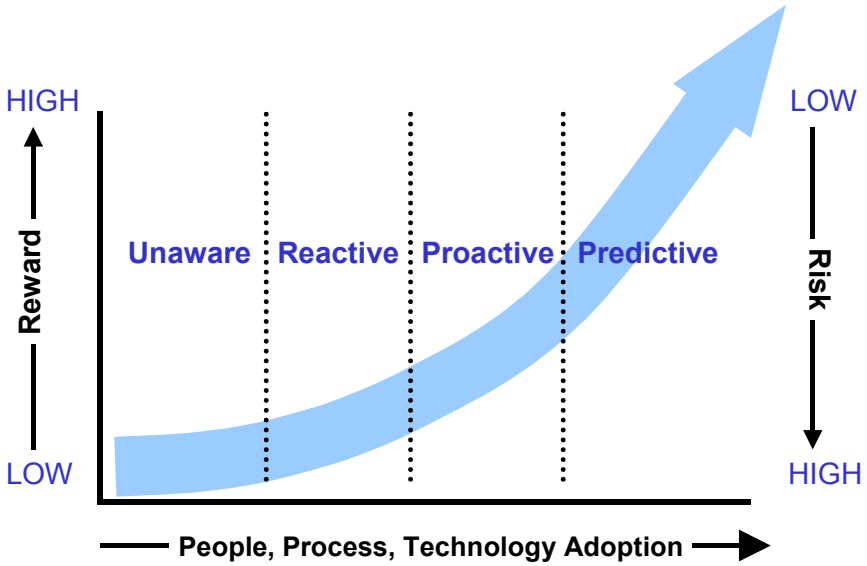


**Figure 1: The Enterprise Data Management Maturity Model**

As Figure 1 displays, the potential rewards escalate as companies move from level to level. And, each stage of the model requires certain contributions and investments. In the discussion below, we look at aspects that define each stage of development, including:

- People – Who is involved and what contributions must they make?
- Process – What activities must be performed?
- Technology – What investments in technology must be made?
- Risk and reward – What risks does the organization face at the current stage – and what could it gain from progressing forward?

This paper examines each stage, and the characteristics of companies within each category. And for each of the first three stages, there are suggestions for progressing within the model – from "Unaware" to "Predictive."

## ***Stage 1 – Unaware***

At the initial stage of the Enterprise Data Management Maturity Model, an organization has few defined rules and policies regarding data management. The same or similar data may exist in multiple files and databases. And redundant data could be available in different data sources with different formats and different names. At stage 1, confusion reigns – and cooperation about data issues between departments or job functions is rare.

Companies in the "Unaware" category have little or no corporate visibility into data management costs or performance. As a result, data quality varies widely across the enterprise. In addition, data management activities are unorganized, and there is no understanding of why problems exist or what impact these problems may cause. Data quality "denial" almost certainly exists at this stage. Surprisingly, more than one-third of all organizations (35%) are at stage 1.[3]

**Table 1: Characteristics of an "Unaware" Company**

| | |
|---|---|
| *People*<br>• Success depends on the competence of a few talented individuals<br>• Organization relies on personnel, who may follow different paths within each effort to reconcile and correct data<br>• No management input or buy-in on data integrity problems<br>• Executives do not comprehend the extent of data problems<br>• Organizations tend to blame IT for data quality issues | *Process*<br>• No defined data management processes in place. Data management is chaotic and project-focused<br>• "Firefighting mode." Address problems as they occur through manually-driven processes<br>• Infrequent long-range resolution to problems<br>• Redundant data exists throughout the organization, leading to wasted resources across functional units |
| *Technology*<br>• Tools tend to be general-purpose software (Microsoft Excel, Microsoft Access) and no intensive data management software is in use<br>• No data profiling, analysis or auditing is used to determine data characteristics<br>• Data cleansing or standardization may occur in isolated areas or data sources<br>• Technologies in place support manual quality improvement methods | *Risk and Reward*<br>• Risk: Extremely high. Data problems can result in lost customers (due to poor understanding of the customer's value) or improper business procedures. A few scapegoats receive the blame, although processes are not in place to properly assign culpability<br>• Reward: Low. Outside of the success of an individual employee or department, companies reap very little benefits from data management |

*Actions Necessary to Advance to Stage 2 (Reactive)*

Due to the risks of the first stage, competitive pressures often serve as the driver for improving data maturity. To progress, companies need to put measures and processes in place to recognize problems with data integrity or usability. Often, it is enough to merely acknowledge that data management issues cause organizational problems and to target the source of these problems. Recognition – plus a commitment to fix data management issues – will help an organization begin to understand data management problems, risks and returns.

[3] "Ascending the Information Maturity Model: Part 1 – Data Quality" by Doug Laney, META Group. March 15, 2002.

## ***Stage 2 – Reactive***

When an organization reaches stage 2, it understands data management problems as they occur. And the organization comprehends that data is critical to its success. Data quality issues are addressed only as major problems occur or projects start to derail. At best, the organization hopes to react to problems to mitigate the severity of outcomes.

At this stage, non-integrated point solutions perform different, specific tasks. Organizations experience variable quality and some predictability in data integrity. In addition, successful individuals receive assignments to the most critical business initiatives to reduce risks and improve results in specific processes. Organizations realize that data management may be of value but are not willing to provide the time and money to prevent problems. Studies show that the largest share of all organizations – 45% – fall into the reactive stage.[4]

**Table 2: Characteristics of a "Reactive" Company**

| | |
|---|---|
| *People*<br>• Success depends on the skills of a group of technical employees (database administrators, IT staff, etc.)<br>• Individuals create useful processes, but no standard procedures exist across groups or locations<br>• Long-range solutions are infrequent<br>• Little corporate management buy-in to the value of data | *Process*<br>• Stronger data management roles emerge, but the emphasis remains on correcting data quality issues as they occur<br>• Most processes are short-range and focus on recently-discovered problems<br>• Within individual groups and departments, tasks and roles are standardized |
| *Technology*<br>• Tactical data management tools are often available (such as solutions for data profiling or data quality)<br>• Most data is not integrated, but some individuals or departments attempt integration efforts in isolated environments<br>• Some database administration tactics emerge, such as reactive performance monitoring<br>• Attempts to consolidate data (such as a data warehouse) requires scrap and rework due to data quality issues | *Risk and Reward*<br>• Risk: High, due to a lack of data integration and overall inaccuracy of data throughout the enterprise. While data is analyzed and corrected sporadically, data failures can still occur on a cross-functional basis<br>• Reward: Limited and mostly anecdotal. Most ROI arrives via individual processes or individuals. Little-to-no corporate-wide recognition of data management benefits |

*Actions Necessary to Advance to Stage 3 (Proactive)*

At stage 2, solutions are non-integrated, disparate point solutions. The impetus for progressing to stage 3 is often a strategic vision by certain managers or executives that better data management processes can lead to tangible business results. To advance, companies have to integrate processes and technologies to achieve more from their data resources. Organizations must also begin to document, establish and enforce data management policies as a core competence of application development. To ensure that the policies are in place, some level of compliance testing is necessary. And finally, organizations must reach a consensus on ownership of the data management processes and assign responsibility and support.

[4] *Ibid, META.*

## ***Stage 3 – Proactive***

Reaching the third stage of the maturity model gives companies the ability to avoid risk and reduce uncertainty. At this stage, data management starts to play a critical role within an organization, as data goes from being an undervalued commodity to an asset that can be used to help organizations make better decisions. As a company in this stage matures, they receive more tangible value from consistent, accurate and reliable data.

At stage 3, a company looks "beyond the horizon" to understand the impact of data problems on mission-critical information. The requisite technology to support high levels of data inspection and correction are in place. And the organization begins to receive executive- and management-level approval for data management projects.

**Table 3: Characteristics of a "Proactive" Company**

| | |
|---|---|
| *People*<br>• Management understands and appreciates the role of data management in corporate initiatives<br>• Data management initiatives receive the personnel and resources necessary to create high-quality data<br>• All or most areas of the organization are involved with data management processes<br>• Executive-level decision-makers begin to view data as a strategic asset | *Process*<br>• Corporate data is more standardized, consistent and measurable. And, preventive measures are in place to assure high levels of data quality<br>• Data metrics are sometimes measured against industry standards to provide insight into areas needing improvement<br>• While in this stage, data management goals shift from problem correction to problem prevention |
| *Technology*<br>• Data management technology providers become strategic partners with the organization – and help define best practices while implementing the technology<br>• A corporate data management group emerges to maintain corporate data definitions, synonyms, business rules and business value for data elements<br>• Ongoing data audits and data monitoring help the company maintain data integrity over time | *Risk and Reward*<br>• Risks: Medium to low. Risks are reduced by providing better information to increase the reliability of decision-making<br>• Reward: Medium to high. Data quality improves, often in certain functional areas and then in broader realms as more employees join the early adopters |

*Actions Necessary to Advance to Stage 4 (Predictive)*

Advancing to the final stage is as much an evolution of culture as it is an evolution of people, process or technology. The culture shift starts to change people's behavior, while new and better processes and technologies give them a better framework for data improvement.

The advances made in the previous stages provide a solid foundation for data management. To evolve to stage 4, you must implement these advances continuously and consistently, primarily by documenting and replicating best practices throughout the enterprise to reach the pinnacle of the Enterprise Data Management Maturity Model.

## ***Stage 4 – Predictive***

At stage 4, organizations achieve almost complete certainty of results. Data quality is an integral part of all business processes, and it is engrained throughout the enterprise. Processes are entirely or almost entirely automated. To keep data within accepted limits, data management processes are implemented in real-time and validated continuously.

Since historical issues of data quality are known and understood, data defect prevention is the primary focus of stage 4 organizations. And there are cross-organizational approaches to data quality, helping companies address data problems that overlap business silos. Finally, an important distinction of organizations in this stage is that data management becomes a business process and not a technological tool.

**Table 4: Characteristics of a "Predictive" Company**

| | |
|---|---|
| *People*<br>• Full management buy-in for data management processes and standards<br>• Data quality improvement has executive-level sponsorship with direct CEO support<br>• A data management group operates across the organization and has the support of data quality stewards, application developers and database administrators<br>• Entire organization is committed to "zero defect" policies for data collection and management | *Process*<br>• Procedures help the organization achieve the highest levels of data integrity<br>• Processes are in place to ensure that data remains consistent, accurate and reliable over time through regular monitoring of data quality<br>• New initiatives begin only after careful consideration of how the initiatives will impact the existing data management infrastructure. |
| *Technology*<br>• Data management tools are standardized across the organization<br>• All aspects of the organizations utilize the standard metadata and rules definitions created and maintained by the data management group<br>• Results of data quality audits are continuously inspected – and any variations are resolved immediately<br>• Data models capture the business meaning and technical details of all corporate data elements. | *Risk and Reward*<br>• Risk: Low. Data is uniform and tightly-controlled, allowing the organization to maintain high-quality information about its customers, prospects, inventory and products<br>• Rewards: High. Solid, corporate-wide data management practices can lead to a better understanding about an organization's current business landscape – allowing management to have full confidence in any data-based decisions. |

At the final stage of the maturity model, a major culture shift has occurred within the entire organization. Instead of ignoring the implications of data management – or treating data quality as a series of tactical projects – a comprehensive, enterprise-wide program elevates the process of managing business-critical data. With backing from executive management and buy-in from all business functions, the program can flourish, creating more consistent, accurate and reliable information to support the entire organization.

# Summary

Achieving the highest level of data management is evolutionary. A company that has not concentrated on the quality of its data cannot expect to progress to the latter stages immediately, primarily because any improvement in data management involves a number of factors. To improve, you have to change the entire culture of your organization – from personnel to technology to management strategies.

For companies who have achieved significant results from improved data, data maturity is not just a technological approach to understanding and correcting data. It's also about implementing sound process to collect and manage information over time. The Enterprise Data Management Maturity Model recognizes that an examination of people, processes and technology identifies ways to improve data integrity over time.

Understanding the Enterprise Data Management Maturity Model is the first step for any organization looking to improve overall data quality. This allows you to understand where your organization fits within the model and determine what, if any, measures should be taken to advance to the next stage. From there, you can understand when it is appropriate to take on additional responsibilities, processes and technology to advance further through the model.

The Enterprise Data Management Maturity Model presented here is meant to educate organizations on how to maximize the value of their data and start treating data as the important strategic asset that it is – or can be. For more information on the technology and processes necessary to improve the quality of your data, go to www.dataflux.com.